Cognitive Development

Human Development: Some Core Issues.

- Altricial versus Precocial species.
- Humans as "secondarily altricial."
- Developmental stages ("morphs") versus continuity.

Core issues, continued

- Mechanisms of developmental change:
  - Maturation
  - Learning
  - Critical periods (learning within a maturational window)
    - Imprinting in goslings
    - Language in children?
Neural Maturation

1.3.4 Growth of neural interconnections
Sections of the human cortex in (A) a newborn, (B) a three-month-old, and (C) a fifteen-month-old. (Carrel, 1939, 1947, 1955)

Cognitive Development

- William James: The "blooming, buzzing confusion."
- Jean Piaget

Piaget:

- Child as scientist.
- Domain-generality.
- Developmental stages:

<table>
<thead>
<tr>
<th>Typical Age Range</th>
<th>Description of Stage</th>
<th>Developmental Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to nearly 2 years</td>
<td>Sensorimotor</td>
<td>Object permanence, Stranger anxiety</td>
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<tr>
<td>About 2 to 6 years</td>
<td>Preoperational</td>
<td>Ability to pretend, Egocentrism</td>
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<tr>
<td>About 7 to 11 years</td>
<td>Concrete operational</td>
<td>Conservation, Mathematical transformations, Abstract logic</td>
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<tr>
<td>About 12 through adulthood</td>
<td>Formal operational</td>
<td>Potential for mature moral reasoning</td>
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<tr>
<td></td>
<td>Abstract reasoning</td>
<td></td>
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</tbody>
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An Alternative View: "Domain Specificity"

- (Modules, intuitive theories, ways of knowing)
  - Intuitive physics.
  - Intuitive psychology ("Theory of Mind").
  - Language.
  - Space.
  - Number.
  - Intuitive biology.
  - Intuitive engineering or design (artifacts, tools).
- Core principles plus acquired knowledge.

Development of Knowledge of Objects (Intuitive Physics)

- What is an object?
- How do you test what a baby knows?
- Habituation technique:

Habituation technique:

- 1. Present a partly hidden event over and over, until baby is bored ("habituated").
- 2. Remove screen, revealing one of two events.
- 3. See which one continues to bore the babies, which one perks them up.
- 4. Conclude: Boring event is the one they had in mind.
Intuitive Physics in Adults

- Curvilinear motion and "impetus" versus Newton's laws.

Development of a "Theory of Mind" (Intuitive Psychology)

- Importance of belief-desire explanations of human behavior.
- People and propositions.
- The false belief task (the Sally-Anne test; the Smarties test) in 3 & 4 year-olds.

- Three-year-olds fail the false belief task
- Four-year-olds pass it
• Three-year-olds fail the false belief task
• Four-year-olds pass it
• But two- and three-year olds do have some intuitive psychology:
  – Pretense
  – Mental state verbs (think, know)
  – Simple theory-of-mind tasks:

Figure 4.6
The display presented to 3–4-year-olds, who are asked “Which chocolate will Charlie take?” Reproduced from Baron-Cohen 1994b.